Shin WATANABE*: *Oocystis minuta* (Chlorococcales) and its new variety from Japanese soils

渡辺 信*: 緑藻クロロコッカム目 *Oocystis minuta* とその1新変種

In the course of study on soil algae from Japan, two green algae were isolated and investigated by the method reported previously (Watanabe 1977). They share the characteristics of the genus *Oocystis* (Oocystaceae, Chlorococcales). One was isolated from soil in the campus of Kyoto University and is identified to be *O. minuta* Guillard, Bold et MacEntee, while the other was from the secondary forest occupied dominantly by *Pinus densiflora* in Shiga Prefecture and is considered to be a new variety of *O. minuta*. The present paper deals with the description of these two algae together with some discussion of the taxonomic status of *O. minuta* and allied species.

A culture of newly described organism is deposited in the Culture Collection of Algae, Institute of Applied Microbiology, University of Tokyo.

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Oocystis minuta Guillard, Bold et MacEntee var. **minuta**, in Phycologia. 14, p. 13, figs. 17–20, 1975. (Figs. 1–3)

Young cells broad fusiform with gently attenuate ends or ellipsoidal with slightly acuminate poles. In older cultures, they becoming ovoid, ellipsoidal or subspherical form without definite ends. Cells 3–8×6–12 μm in size. The cell wall thin and smooth, and neither expanded wall nor thick gelatinous matrix present around the cell through the life cycle. The chloroplast parietal with shallowly, irregularly incised margin, occupying about 2/3–3/4 of the cell's periphery. The pyrenoid single, spherical, covered by two hemispherical starch grains which are closely arranged in most individuals and apparent in form even in old cultures. The nucleus and nucleolus visible in living cells. Vacuoles absent. Oil droplets abundant in old cells.

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Reproduction by forming autospores. Mother cell wall splitting along the longitudinal axis when discharging the autospores.

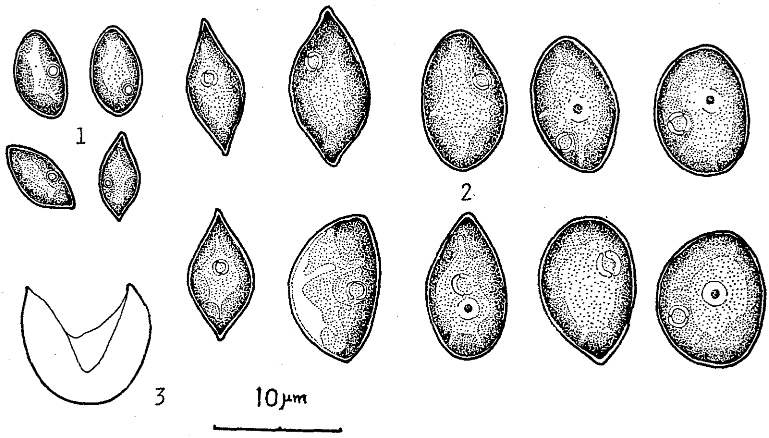
Plant mass green and smooth; but the color changing to reddish brown in old cultures.

Culture No. KUC 15-7.

Although *O. minuta* was discovered from brackish water by Guillard et al. (1975), the examination of the specimen deposited in the Texas Culture Collection (No. 2071) showed that the present isolate (KUC 15-7) is morphologically identical with it.

Oocystis minuta var. **vacuolata** S. Watanabe, var. nov. (Figs. 4-8)

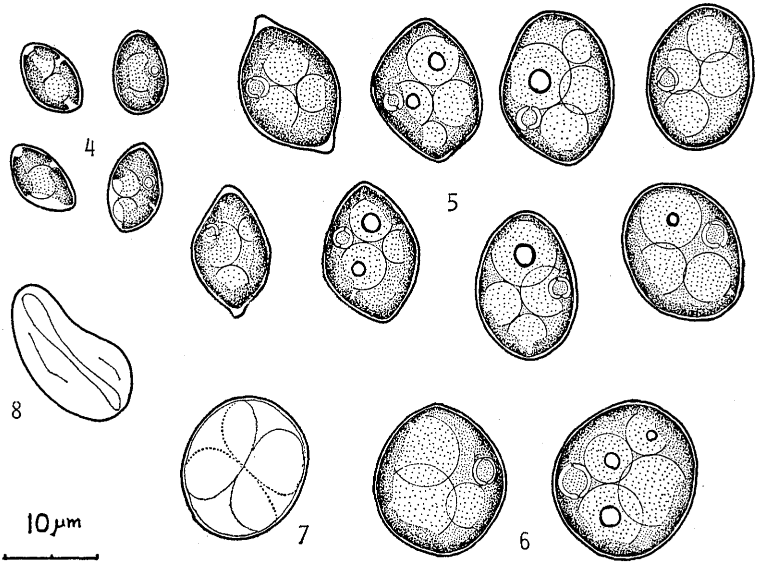
Cellulae 6-9×10-16 μm. A typo differt magniore dimensione cellulae et praesentia abundantium vacuolarum.



Figs. 1-3. *Oocystis minuta* Guillard, Bold et MacEntee var. *minuta*. 1, young cells. 2, adult cells. 3, an empty mother cell wall.

Origo: Plantae e solo sylvae *Pini densiflorae* in loco Shigaken dicto, m. Sept., 1975 lectae; numerus culturae HKN-31. Holotypus: Figs. 4-8.

Cells ellipsoidal, but sometimes broad fusiform with definite ends in actively growing cultures. In older cultures, they becoming polymorphic and generally swollen. Spiny projections absent but nodule-like thickenings sometimes present at ends. The cell wall not expanding through the life cycle. Cells 6-9×10-16 μm in size. The chloroplast parietal, rarely with an opening,



Figs. 4-8. *Oocystis minura* var. *vacuolata* S. Watanabe, var. nov. 4, young cells. 5, adult cells. 6, cells in old cultures. 7, a mother cell containing autospores. 8, an empty mother cell wall.

and sometimes in net-like shape. A single pyrenoid, spherical, located in the part of thickening of the chloroplast and covered by two hemispherical starch grains which are closely arranged. The nucleus not observed in living cells. The cytoplasm highly occupied by vacuoles.

Reproduction by forming 4(−8) autospores. Mother cell wall splitting deeply.

Plant mass green and smooth, but the color changing to yellow-brown in old cultures.

The distinct characters between var. *minuta* and var. *vacuolata* are the the larger size of the cell and the presence of abundant vacuoles in the latter. Var. *vacuolata* resembles *O. alpina* Reisigl (1964) in having vacuoles, but the two are distinguished from each other by the smooth cell wall in the former and the presence of longitudinal ridges on the cell wall in the latter.

According to Řehaková (1969), most important features to characterize the genus *Oocystis* are the presence of apical thickenings and the occurrence of expanded mother cell wall. The cells of *O. polymorpha* and *O. minuta* (and also *O. alpina* ?) assume the ellipsoidal form or sometimes broad fusiform with acuminate poles or apical thickenings, and from this character, they have been included in this genus by many workers, including Reisigl (1964), Groover and Bold (1968), and Guillard et al. (1975). This treatment is also adopted here by the present author. However, it should be noticed that the mother cell walls of these species do not expand throughout their life cycle. Then, a question arose in the generic taxonomy as to whether the occurrence of expanded mother cell wall should be appreciated at the generic rank. Fott and Řehaková (1963) emphasized this character to be used as a generic criterion and distinguished the closely resembled two genera *Oocystis* and *Siderocelis*. Currently in *Oocystis* have been included into some species which possess the ornamented cell wall. *Siderocelis*, an Oocystacean genus described by Fott (1934), is characterized by the ornamentation at the cell wall like some species of *Oocystis*. Fott and Řehaková included in *Oocystis* those algae having an expanded cell wall and in *Siderocelis* those having no such a wall. In so far as their taxonomic evaluation is accepted, the two species mentioned above should be excluded from *Oocystis* because of the absence of expanded cell wall. If we consider the ornamentation to be a specific criterion, the two species, in spite of the absence of ornamentation, may be included in *Siderocelis*. Or if we consider it to be a generic one, they also should be excluded from *Siderocelis* and may be included in a new genus which morphologically stands at an intermediate position between *Chlorella* whose cells are spherical or ellipsoidal, and *Keratococcus* or *Closteriopsis* whose cells are usually fusiform.

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京都大学構内と滋賀県のアカマツ林の土壌から*Oocystis*属の2つの緑藻を分離した。第1の緑藻はすでに汽水から記録された*O. minuta*と同定された。第2の緑藻は第1のよりも細胞が大きいことと多くの空胞があることで区別できるので，*O. minuta* var. *vacuolata*の名を与え，新変種として記載した。属内の他の種とは異り，この種と*O. polymorpha*では母細胞の細胞壁がふくらむことはなく，自生胞子と母細胞とは密着している。この特徴により，Fott & Řehaková (1963) は*Oocystis*属と*Siderocelis*属とを区別している。この定義に従えば，上記の2種は*Oocystis*属から除外されるべきと考えられる。それらに分類学的位置を与えるためには，*Siderocelis*属にみられるイボ状突起を種段階の特徴とみなして，この属に含める場合と，属段階の特徴とみなして，円型の細胞をもつ*Chlorella*属と紡錘型の細胞をもつ*Keratococcus*属もしくは*Closteriopsis*属の中間の形態的特徴をもつ新属をたて，それに含める場合とが考えられる。

○高等植物分布資料 Materials for the distribution of vascular plants in Japan

96 エゾオオヤマハコベ *Stellaria radians* L. (New to Central Honshu) 本種は牧野・大井・北村博士等の著書では，北海道だけが国内の産地としてあげられている。しかし東大腊葉室には早くから陸奥，野辺地（木梨延太郎 Aug. 1911）の標本があり，水島博士は本誌 **40**: 254 (1965) で‘本州では青森県に一産地がある’と記された。ところが本年10月，はからずも長野県軽井沢町塩沢の路傍で，佐藤邦雄氏が開花中の本種を見出された（標本はTI）。葉は幅広く，樺太産で名付けられたヒロハエゾオオヤマハコベの形に一致する。生育地が路傍であるので，他所から人為的に移入された可能性も考えてみたが，これを裏付けるような要因は何もなかった。一方この地方からはエンビセンノウ，ハナヒョウタンボク，ヤマタバコ等の稀品の自生が知られているので，本種も自生とみてよいように思われる。とにかく今迄知られていた産地からは遠く離れているので，ここに記録しておくことにした。（原　寛 Hiroshi HARA）